

REMARKS

Claims 1-15 remain pending in the application. Claims 1-4, 6, 7 and 9 have been amended. Reconsideration of the rejection and allowance of the pending application in view of the following remarks are respectfully requested.

As an initial matter, Applicant wishes to thank the Examiner for acknowledging Applicant's claim for foreign priority and receipt of the certified copy of the priority document, and for considering all of the documents cited in the Information Disclosure Statement filed on June 17, 2004.

As another matter, Applicant notes that the Examiner has not yet indicated whether the drawings filed on March 17, 2004 are acceptable. Applicant respectfully requests that the Examiner confirm the acceptability of the drawings in the next Office communication.

In the Office Action, the Examiner rejects claim 7 under 35 U.S.C. § 112, 2nd paragraph. In this regard, the Examiner asserts, at page 2 of the Office Action, that there is insufficient antecedent basis for the limitation "the first operation mode". Applicant has amended claim 7 to depend on claim 4, which recites "a first operation mode". Thus, Applicant respectfully submits that there is antecedent basis for the recitation "the first operation mode" in claim 7.

In the Office Action, the Examiner rejected claims 1, 2, 4, 7-10, 12 and 15 under 35 U.S.C. §103(a) as being unpatentable over Iacobovici et al. (U.S. Patent No. 6,704,876) in view of Ishii (U.S. Patent No. 6,940,359). Applicant respectfully traverses the rejection for at least the following reasons.

Applicant's independent claim 1 recites a processor which operates at a

frequency of a clock signal supplied from a clock oscillator and with a power supply voltage supplied from a power supply circuit. The processor controls the frequency supplied from the clock oscillator and the power supply voltage supplied from the power supply circuit so that energy consumed by processing a predetermined amount of data is within a predetermined range of a minimum value of energy consumption. The energy consumption is defined by the frequency, the power supply voltage and a power supply efficiency of the power supply circuit.

Applicant's independent claim 9 recites a method for driving a processor which operates at a frequency of a clock signal to be supplied from a clock oscillator and with a power supply voltage to be supplied from a power supply circuit. The method includes controlling the frequency supplied from the clock oscillator and the power supply voltage supplied from the power supply circuit, so that energy consumed by processing a predetermined amount of data is within a predetermined range of a minimum value of energy consumption. The energy consumption is defined by the frequency, the power supply voltage, and power supply efficiency of the power supply circuit.

Iacobovici discloses a computer system 2 which is driven by a CPU 4, and includes a power dissipation control mechanism 28. See Figure 1, col. 2, lines 44-47, and col. 3, lines 20-25 of Iacobovici. The power dissipation control mechanism 28 includes a power estimation circuit 50 which estimates the power dissipation of the CPU 4 in a selected time interval. See Figure 3 and col. 4, lines 1-5 of Iacobovici. Iacobovici discloses, at col. 4, line 5-27, that the speed of

the CPU 4 is adjusted (or the CPU 4 is stalled) based on a comparison of the estimated power dissipation with values stored in a PHWM register 52 and a PLWM register 54.

Applicant respectfully submits that Iacobovici's CPU 4 does not control a frequency and a power supply voltage so that energy consumed by processing a predetermined amount of data is within a predetermined range of a minimum value of energy consumption, as recited in Applicant's independent claim 1. Rather, Applicant submits that Iacobovici's invention is directed towards controlling power consumption, not energy consumption, which Applicant submits is different.

As explained at page 2, lines 2-21 of Applicant's specification, minimizing a power consumption per unit time does not always equate to minimizing the energy consumption of a process, as minimizing a power consumption per unit time decreases a power supply efficiency and increases the time it takes to complete the process (thus increasing the energy consumption of the process).

This is illustrated, for example, in Applicant's Figure 3 and Table 1 at page 11 of Applicant's specification, and described at page 12, lines 2-19. In the example shown in Table 1, power consumption is minimized when the power supply voltage is 0.935 V and the clock frequency is 133 MHz. However, energy consumption is minimized when the power supply voltage is 1.1 V and the clock frequency is 200 MHz.

Applicant respectfully submits that Iacobovici does not take a processing time into account, and thus is not concerned with the energy consumed by

processing a predetermined amount of data. Rather, Iacobovici only estimates a power dissipation in a selected time interval. See, e.g., col. 4, lines 3-5 of Iacobovici. As a result, the power control for minimizing power consumption, as disclosed by Iacobovici, does not always achieve low power consumption operation in terms of battery drain.

Applicant further submits that Ishii, which is directed towards a PLL frequency synthesizer, fails to overcome the above-noted deficiencies of Iacobovici. Thus, Applicant respectfully submits that the combination of Iacobovici and Ishii fails to disclose or suggest a processor which controls a frequency supplied from a clock oscillator and a power supply voltage supplied from a power supply circuit so that energy consumed by processing a predetermined amount of data is within a predetermined range of a minimum value of energy consumption, defined by the frequency, the power supply voltage and a power supply efficiency of the power supply circuit, as recited in Applicant's independent claim 1.

Applicant further submits that the combination of Iacobovici and Ishii fails to disclose or suggest a method for driving a processor which includes controlling a frequency supplied from a clock oscillator and a power supply voltage supplied from a power supply circuit, so that energy consumed by processing a predetermined amount of data is within a predetermined range of a minimum value of energy consumption, defined by the frequency, the power supply voltage, and power supply efficiency of the power supply circuit, as recited in Applicant's independent claim 9.

For at least these reasons, Applicant respectfully submits that the inventions recited in Applicant's independent claims 1 and 9 are not obvious in view of Iacobovici and Ishii, and thus respectfully requests that the Examiner withdraw the 35 U.S.C. §103(a) rejection and allow claims 1 and 9.

Dependent claims 2, 4, 7, 8, 10, 12 and 15 are also submitted to be in condition for allowance for at least the reasons set forth above with respect to claim 1, from which they depend.

In the Office Action, the Examiner rejected claims 3 and 11 under 35 U.S.C. §103(a) as being unpatentable over Iacobovici and Ishii, and further in view of Altmejd et al. (U.S. Patent No. 6,795,927), and rejected claims 5, 6, 13 and 14 under 35 U.S.C. §103(a) as being unpatentable over Iacobovici and Ishii, and further in view of Plante (U.S. Patent No. 7,058,824). Applicant respectfully traverses the rejection for at least the following reasons.

Applicant respectfully submits that Altmejd et al. and Plante fail to overcome the above-noted deficiencies of Iacobovici and Ishii. Thus, Applicant submits that the combinations of Iacobovici, Ishii and Altmejd et al. and Iacobovici, Ishii and Plante suggested by the Examiner fail to disclose or suggest a processor which controls a frequency supplied from a clock oscillator and a power supply voltage supplied from a power supply circuit so that energy consumed by processing a predetermined amount of data is within a predetermined range of a minimum value of energy consumption, defined by the frequency, the power supply voltage and a power supply efficiency of the power supply circuit, as recited in Applicant's independent claim 1.

For at least these reasons, Applicant respectfully submits that dependent claims 3, 5, 6, 11, 13 and 14, which depend from claim 1, are in condition for allowance, and respectfully request that the Examiner indicate as such in the next Office communication.

Based on the above, it is respectfully submitted that this application is now in condition for allowance, and a Notice of Allowance is respectfully requested.

SUMMARY AND CONCLUSION

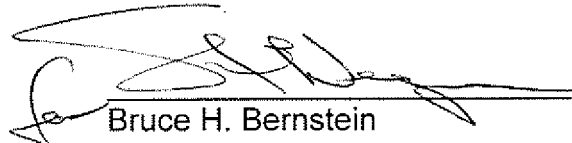
Entry and consideration of the present amendment, reconsideration of the outstanding Office Action, and allowance of the present application and all of the claims therein are respectfully requested and now believed to be appropriate. Applicant has made a sincere effort to place the present invention in condition for allowance and believes that he has now done so.

Any amendments to the claims which have been made in this amendment, and which have not been specifically noted to overcome a rejection based upon the prior art, should be considered to have been made for a purpose unrelated to patentability, and no estoppel should be deemed to attach thereto.

Should an extension of time be necessary to maintain the pendency of this application, the Commissioner is hereby authorized to charge any additional fee to Deposit Account No. 19-0089.

Should the Examiner have any questions or comments regarding this response, or the present application, the Examiner is invited to contact the undersigned at the below-listed telephone number.

Respectfully submitted,
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